

Searching for NEAs from Earth or Space

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In the course of studying strategies for discovery surveys of near-Earth asteroids (NEAs), the possibility of doing a survey from space has been mentioned. I report here a study of the relative effectiveness of operations from space vs. from the ground. Not surprisingly, the main factors determining effectiveness are (1) light collecting area (telescope aperture), (2) total number of resolution elements collecting light simultaneously (number of pixels for a well-scaled system), and (3) duty cycle of the system (fraction of time actually recording data). The theoretically greater sky area accessible from space makes little difference over a well-chosen ground site. Of these three factors, (1) favors ground operations over space, (2) is a technological limitation at the moment, until such time as large enough arrays of CCDs can be fabricated to capitalize on higher resolution available from space, and (3) has a theoretical advantage of a factor of a few for space operation, but has not been realized for any space-borne telescope yet (*cf.*, HST has an effective duty cycle of $\sim 15\%$, comparable to ground-based telescopes). The good news is, it appears possible to catalog most potentially hazardous NEAs down to ~ 1 km in diameter with a modest ground-based survey, over a period of about a decade. Thus there is little reason to advocate a space survey for this purpose.